TEACHER TRAINING: AN EXAMINATION OF SKILL ACQUISITION GENERALIZATION, AND INCREASES IN CHILD APPROPRIATE BEHAVIOR

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The effects of a training package (modeling, role-playing, and feedback) were evaluated using a multiple baseline across skill areas. Two trainers taught two teachers to use basic intervention skills that included components of both discrete trial teaching (DTT) and the Natural Language Paradigm (NLP). Training occurred in the context of one task. Generalization was assessed with two untrained tasks. Teachers' responses in the target task increased following training, as did appropriate responding from the child. Some generalization of the teaching skills occurred. Teachers were instructed to generalize acquired skills as a possible method to promote generalization. The results of these findings and implications for training of ABA providers are discussed.

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INTRODUCTION

A review of recent literature related to behavioral studies with children with autism has revealed that instructional techniques derived from applied behavior analysis have led to considerable progress in the lives of these young children (Anderson & Romanczyk, 1999). Teachers and parents are primarily responsible for implementing these techniques that will lead to behavior change and thus they are referred to as change agents. Because the characteristics of applied behavior analysis are so complex and the techniques used are so precise, it is important to train these behavior change agents effectively so that behavior change can be imminent.

A number of studies utilize training packages to successfully teach change agents to modify behaviors that they could not modify before. In such studies, acquisition of target skills is apparent (Baer, Peterson, & Sherman, 1967; Cooper, Thomson, & Baer, 1970; Cossairt, Hall, & Hopkins, 1973; Garcia, Baer, & Firestone, 1971; Gardner, 1972; Harris, Peterson, Filliben, Glassberg, & Favell, 1998; Isaacs, Embry, & Baer, 1982; Jones & Eimers, 1975; Panyan, Boozer, & Morris, 1970; Ringer, 1973). Also of interest is whether or not those change agents are able to use the skills they acquired under conditions that are different from the conditions under which they were trained. For example, using the skills with a variety of children, varied tasks, and different settings. These examples would represent the occurrence of generalization of the change agent's skills. Generalization is often found across subjects, time or similar tasks (Ducharme &

Feldman, 1995; Feldman, Case, Rincover, Towns, & Betel, 1989; Gladstone & Sherman, 1975; Gladstone & Spencer, 1977; Horton, 1975; Koegel, Glahn, & Nieminen, 1978; Koegel, Russo, & Rincover, 1977; Lovaas, Koegel, Simmons, & Long, 1973; Peck, Killen, & Baumgart, 1989). Those teaching skills, however, rarely generalize to other task areas or even to the acquisition of other teaching skills, (Koegel, Glahn, & Nieminen, 1978; Page, Iwata, & Reid, 1982). Appropriate procedures required to produce generalization are a common concern among investigators (Bernstein, 1982; Stokes & Baer, 1977). This concern is even more complicated when training behavior change agents, such as teachers, where the most favorable outcome in such a training program would be generalization in both the teacher and the student's behavior.

Children make considerable gains when assessment and interventions are based on generally accepted scientific evidence (Anderson & Romanczyk, 1999). Many behavioral models have emphasized the need for intensive one-on-one treatment to build initial skills (Anderson, Taras, O'Malley Cannon, 1996; Lovaas, 1987). In one method of one-on-one intensive training, referred to as discrete trial training (Anderson, et al., 1996; Koegel, Russo, & Rincover, 1977; Lovaas, 1987), the instructor presents a clear and concise instruction whenever the child is attending to the teacher or the task materials. The teacher delivers a consequence following the child's appropriate responding. Consequences usually consist of praise and tangible objects (i.e., a toy, food, a favorite juice drink, etc.) If the child does not respond correctly, the instructor may provide feedback and a prompt to obtain the desired response. The trial is often quickly repeated to give the child an opportunity to respond correctly without the added prompt. Behavioral teaching methods can also take place within the natural environment

(Anderson & Romanczyk, 1999; Hart & Risley, 1980). During natural environment teaching interactions, the teacher follows the child's lead and interests, restricts access to high interest items, and constructs a lesson within the natural context, with a presumably more motivated child (Anderson & Romanczyk, 1999). One variation of this approach to teaching language skills is called the Natural Language Teaching Paradigm, or NLP (Koegel, O'Dell, & Koegel, 1987). Both teaching methods, (discrete trial and natural environment), are considered important tools for practitioners (Anderson & Romanczyk, 1999; Association for Behavior Analysis Autism Special Interest Group, 1998).

For successful implementation of discrete trial methods, teachers must effectively deliver instructions and provide social and tangible consequences following desired responding (Anderson & Romanczyk, 1999; Anderson, Taras, & Cannon, 1996; Carr, Bailey, Ecott, Lucker, & Weil, 1998; Kazdin & Moyer, 1976; Lovaas, 1987). Additionally, it is necessary that teachers acquire the skills that can be used to increase language usage in the natural environment, such as NLP procedures (Hart & Risley, 1980; Koegel, O'Dell, & Dunlap, 1988; Koegel, O'Dell, & Koegel, 1987).

Training programs designed to help teachers acquire teaching skills have been widely investigated. Procedures such as modeling (Baer, Peterson, & Sherman, 1967; Garcia, Baer, & Firestone, 1971; Ringer, 1973), role-playing (Gardner, 1972), and feedback (Cooper, Thomson, & Baer, 1970; Fabry & Reid, 1978; Harris, et al., 1998; Panyan, Boozer, & Morris, 1970) have been examined alone and in combination with one another. Component analysis has revealed that training programs consisting of only modeling and role-playing may be ineffective unless the training is followed by feedback (Demchak, 1987). A review of these investigations suggests implementation of a

complete training package including modeling, where the trainer demonstrates the desired behavior; role-playing, where the trainer acts as the teacher's subject while the teacher attempts to perform the desired behavior; and feedback, where the trainer provides the teacher with information regarding based on their performance relative to the target behavior is most effective (Demchak, 1987; Harchik, 1989).

Generalization of acquired teaching skills has also been addressed. Generalization techniques are found in the behavioral literature and have been classified by Stokes and Baer (1977). The change agent literature has utilized several of these techniques in efforts to produce generalization of behavior change. One technique, identified as "programming common stimuli" produced generalization across settings and clients, but not across teaching tasks (Ducharme & Feldman, 1992; Stokes & Baer, 1977). Another technique, "train and hope", produced generalization to other very similar teaching tasks with some teachers (Gladstone & Sherman, 1975; Stokes & Baer, 1977). The technique of "training sufficient exemplars" has produced varied results in the literature, some with significant generalization occurring and some with no signs of generalization at all (Ducharme & Feldman, 1992; Horton, 1975; Koegel, Russo, & Rincover, 1977; Stokes & Baer, 1977). "Training loosely" resulted in generalization of acquired skills to other settings (Peck, et al., 1989; Stokes & Baer, 1977).

Of particular interest here is a technique referred to as "mediated generalization" (Stokes & Baer, 1977). Generalization across settings has been promoted through the use of a verbal instruction to generalize. In one such study, generalization did occur (Feldman, et al., 1989). Feldman investigated the effects of an instruction to generalize on parents' praise and imitation of their children's vocalizations. These parents with

mental retardation were trained these skills in one context, play, and were instructed to utilize their skills "at all times" when they are interacting with their children, "not just during play time" (Feldman, 1989). Generalization was seen after use of this technique in specifically probed areas (changing diapers, feeding, clothing, etc.), however, the frequency of the implementation of this instruction was unclear (Feldman, 1989). Furthermore, the effects of mediated generalization were not tested across tasks.

The desired effect of most teacher training programs is that they be effective and efficient. The circumstances of families of children with autism often involve high levels of stress, grave financial difficulties, or cultural differences between family and therapists that make efficiency of a training program even more important (Robbins, Dunlap, & Plienis, 1991). In addition to the effectiveness and efficiency, however, generality of the teaching behaviors trained is also desired even though ensuring generalization requires more time than ignoring it (Baer, Wolf, & Risley, 1968). It can be assumed that most training programs are primarily concerned with introducing the change agent to the natural maintaining contingencies that would transfer control of responding from the trainer-imposed contingencies to the contingencies within the teaching environment (Stokes & Baer, 1977). Mediated generalization, in this case, instructing the change agent to generalize his or her own behavior (Stokes & Baer, 1977), appears to be a promising technique. The purpose of this study was to evaluate the effects of a training package on the target skills displayed by teachers of children with autism, to assess generalization of those skills, and to examine the effectiveness of mediated generalization procedures to promote some desired generalization of the teachers' newly acquired skills to other task areas.

CHAPTER 2

METHOD

Participants

Two teachers participated in this study. Both were enrolled in an introductory course on autism in the Department of Behavior Analysis at the University of North Texas. Both had some experience in human services but not specifically in early intervention. Two trainers implemented the training package, one with each teacher. One of those trainers was the primary experimenter, author of this study, and a graduate student. The other was a senior undergraduate student majoring in Behavior Analysis. The two trainers had at least 2 years of direct treatment experience with children with autism, yet their strengths and experience in supervising and training teachers to work with this population varied.

At the start of this study, the child was a 2.8 year-old male diagnosed with autism. The Childhood Autism Rating Scale (CARS) administered at age 2 resulted in a score of 37, placing him as moderate to severely autistic. The Vineland Adaptive Behavioral Scales administered at the same time places the child's functioning at an age range of 1 year 3 months to 1 year 5 months on all domains tested (communication, daily living, socialization, and motor skills, scoring highest in the latter two categories). The child had been receiving therapy from trained behavior analysts in his home approximately four hours a day starting five months before onset of this study and continuing throughout the experiment. At the onset of the therapy program he was speaking only in one word

utterances and the rate of those utterances was about one per min. Current goals for his home program included increasing eye contact, increasing his word utterance length to two and three words, increasing the overall rate of requests, identifying objects in his environment both receptively and expressively, following one-step directions given orally, tolerating work and play in the absence of his mother, and imitating actions or vocalizations. The child also attended a day care program seven hours each week outside of his home.

Settings and Materials

Three tasks from his current home therapy program were chosen for training and generalization measures. Those tasks were expressive labeling of pictures (Task 1), receptive identification of objects in the environment (Task 2), and following auditory one-step directions (Task 3).

The experiment was conducted in two settings both inside the child's home. One setting was the child's play room (approximately10 ft x 10 ft). This room contained an open bookshelf with play materials, an open toy box with play materials, a child-sized table and four chairs, and a box with fastening lid filled with various books. Double doors occupied one wall and three uncovered windows facing a residential street occupied the other wall. This setting was used for Tasks 1 (receptive labeling) and 3 (direction following) of the experiment. Materials used in this setting were picture flashcards and tangible items to be utilized as consequences (e.g., toy cars, writing boards and writing instruments, bubbles, books, and juice).

The kitchen (approximately 18 ft x 6 ft) was used as a second setting where Task 2 (environmental identification) was performed. This setting consisted of a table and

chairs, doors, refridgerator, stove, dishwasher, microwave, dog food and bowls, trashcan and cabinets as well as tangible items to be utilized as possible reinforcers (e.g., toy cars, writing boards and writing instruments, bubbles, and juice).

Dependent Measures

The dependent measures included both teacher and child behavior. Appendix C contains the complete observation code, protocols, and datasheets for all measures. A VHS-C video recorder was used to record experimental sessions. Data were collected upon viewing the tapes. Each teaching skill was divided into behaviors necessary to meet an established criterion. Instructions are one component of discrete trial teaching.

Giving instructions. Instructions were defined as an oral command clearly specifying a response to be performed. The components of giving appropriate instructions included (a) waiting for the child to orient his face toward her body, (b) using a neutral voice, (c) stating the instruction clearly (without use of excess wording), and (d) only giving the instruction one time before prompting or rewarding the behavior. Only instructions specific to the current task were recorded (i.e., during the expressive labeling task, instructions such as “sit down” or “come here” were not recorded and during the direction following task, instructions such as “what’s this?” were not noted). The number of task related instructions and instructions meeting criteria were recorded. Both the teacher and trainer were given an 8.5” x 11” sheet of paper containing the task related targets in each task area (e.g., for expressive labeling, targets were labeling “dog”, “ball”, “car”, etc.; for environmental identification, targets included finding the refridgerator, table, stove, trash, etc.; and for following directions, targets were clap your hands, crash the cars, sit down, etc.). The targets were not worded on the sheet in the form of an

instruction (e.g., the word "stove" on the sheet and the teacher had to instruct the child to "find the stove"). Each task related instruction given by the teacher had to contain all of the above components to meet criteria of an appropriate instruction.

Descriptive praise statements, another component of discrete trial teaching, that occurred after the child's responses were also recorded. Praise consisted of encouraging vocal statements to the child and was noted as descriptive if it contained one or more words specifically related to the child's correct response (i.e., "That's right, you said 'hammer'"). Other general praise did not include words describing the particular response (i.e., "Good job, way to go") made by the child.

Natural Language Teaching Paradigm (NLP). The Natural Language Teaching Paradigm (Koegel, O'Dell & Koegel, 1987) includes the following components: (1) stimulus items accessible for child's choosing are age-appropriate and found in the child's natural environment (these varied every few trials), (2) prompts for vocalizations consisted only of a vocal model from the teacher, (3) both the child and teacher interact with the stimulus item, (4) the child's attempts to respond vocally are reinforced, and (5) the reinforcer is access to play with the item (a natural occurring consequence).

The specific components of NLP measured in this study were (a) arranging opportunities for language (withholding child's access to a desired item) and (b) accepting child's vocal approximations (allowing access to the desired item when the child attempts to request the item). The teacher arranged opportunities by observing the child to see what items or activities were of apparent interest to the child, placing or holding the item of interest out of the child's reach and either looking expectantly at the child and waiting for a vocalization or simply asking the child what he wants and waiting

for the vocalization. If the teacher granted access immediately after the child's vocalization, she arranged an opportunity and accepted his approximation. If the teacher did not grant access to the item after the child vocalized, she arranged an opportunity but did not accept an approximation.

Child measures. Data were collected on the number of word approximations throughout the observation period (i.e., "buh" when reaching for a ball would count as one word approximation or "bye bye tray" when teacher erases a train she just drew would count as three word approximations). Correct responses to the task related instructions were also recorded (i.e., teacher asks "What's this?" while holding up a picture of a key. If child says "tee" the trial would be scored as correct, other responses not resembling "key" such as "puppy dog" would be counted as incorrect. If child did not respond to the instruction, the trial was marked incorrect.)

Independent Variables

The effects of a series of variables were evaluated. First, a one session only training package that involved modeling, roleplaying and feedback was introduced. Modeling and roleplaying each consisted of 5 trials each. The trainer modeled the targeted teacher skill with the child for 5 trials while explaining the components necessary to meet criteria for that skill. The teacher then roleplayed the target skill for 5 trials with the trainer acting as the child. The teacher was provided with feedback based on those 5 roleplaying trials. The observation period for Task 1 then began. The teacher received feedback again at the end of the 5 min observation period for Task 1. No further modeling, roleplaying or feedback was provided for that teaching skill.

Second, an enhanced training package was applied to the NLP teaching components. A quota was set for the teacher to have a minimum number of times to practice arranging opportunities for requests and accepting the child's vocal approximations for the session. The quota was figured by doubling the current frequency of attempts at that skill, (i.e., if the teacher arranged 7 opportunities in the previous session, the quota would be 14).

Third, the teacher was instructed to use skills learned in Task 1 in other task areas. These instructions to generalize were given either generally (i.e., asking the teacher to practice the particular teaching skill at criteria in all settings with all of the child's tasks), or specifically (i.e., asking the teacher specifically to practice a particular skill in a particular setting with a particular task).

Procedures

Design and Sequence. A multiple baseline was utilized across two sets of teaching skill components (DTT and NLP). The intervention package was applied only during the training condition Task 1 (expressive labeling) in the first setting (the child's playroom). This multiple baseline was replicated with a second teacher.

During baseline and throughout the experiment, the sequence of observations in each task and setting was expressive labeling (Task 1, in playroom), environmental identification (Task 2, in kitchen), then direction following (Task 3, in playroom). Environmental identification always occurred in the kitchen and was the only task performed in the kitchen. Five mins were observed in each task with a short break in between tasks with the exception of the first three sessions where an experimenter error occurred and the trainer for Teacher 1 did not complete the full 5 mins for all three tasks.

For teacher training phases, the training package was only implemented at the beginning of the session in the playroom setting with the expressive labeling materials. No modeling, roleplaying, or specific feedback was given in the other setting, utilizing the other materials, or in the context of another task. Tasks 2 and 3 served as probes to check for generalization of the teaching skills trained in task 1.

Observation, training, and generalization probes were conducted two to three times per week and each session lasted about 45 mins. The teachers received training concurrently on separate days of the week. The first teacher's sessions were at the end of the week. One session took place late in the morning just a couple of hours before the child's lunch while her other session was scheduled for early in the evening the following day just before the child's dinner. The second teacher's sessions fell at the beginning of the week. Those sessions were at the same time of day, late in the afternoon just after his daily nap. The two experimenters performed the training and data collection, one for each teacher. The experimenter for each teacher remained constant throughout the experiment. The child's parents were present in the home at all times and the mother observed most of the training and videotaping.

Interobserver Agreement

A research assistant collected interobserver agreement data on 20 percent of the experimental sessions and during each condition of the study using the observation protocol in Appendix C. Before any data were collected, video examples and non-examples of the target behaviors were shown and discussed. The experimenter and research assistant than practiced the data scoring while blocking the view of the other's data sheet. The research assistant was thereafter alone when scoring the experimental

sessions without the assistance or presence of the experimenter. The 5 min observation sessions were broken into 10 s intervals for data collection. This interval recording method was used to allow post hoc targeted examination of the data.

Occurrences of behavior were recorded and frequencies calculated. Interobserver agreement was calculated (number of occurrences of target behavior were recorded by each observer, the smaller number was divided by the larger, and that number was multiplied by 100) and averaged 92% across the entire experiment with both teachers. Table 1 illustrates the breakdown of agreement with both teachers and the child in each task.

CHAPTER 3

RESULTS

For all graphs illustrated on the following figures, solid condition lines crossing two graphs indicate the use of a multiple baseline design to evaluate the effects of the training package across DTT and NLP. Solid condition lines within a single graph indicate an intervention on the teacher skill represented in that graph. Hatched condition lines indicate at what point independent variables were manipulated to evaluate effects on all dependent variables.

Conditions are noted with the following abbreviations; "B" for baseline, "T" for training, "M" for maintenance, "ET" for enhanced training, "G" for general instruction to generalize, and "S" for specific instruction to generalize.

Training Task – Expressive Labels

Figure 1 illustrates both teacher and child behavior during the training task, expressive labels (Task 1). Teacher 1 is represented in the upper half of the page, and Teacher 2 is represented in the lower half of the page. Graphs for both teachers reflect teacher behavior with respect to the two directly trained skill areas. The top left graph for each teacher represents the rate per min of that teacher's instructions and the graph just below it represents the components the NLP (arranging opportunities and accepting approximations).

The open circles (instructions graph) represent the rate per min of task related instructions given and the closed circles represent the rate of task related instructions that

met the criteria for an appropriate instruction. In this graph, the two lines coming closer together represent a convergence between the number of instructions given and the number that met the training criteria. The open diamonds (NLP graphs) represent the rate of opportunities for the child to request that were arranged by the teacher and the closed triangles represent the rate of reinforcement delivered by the teacher following word approximations. The two lines ascending and remaining close together indicate training criteria were met. The graphs to the right of each of these represent child and teacher behavior together, in relation to the specific targeted skill area. Again, the open circles indicate the rate of task related instructions given. The crosses represent rate of correct responses by the child and the x's represent rate of descriptive praise statements the teacher made following the child's correct responses. The closed inverted triangles (lower right graph, each teacher) represent the rate of the child's word approximations and the open squares represent the rate the teacher contingently withheld access to an item or activity.

Teacher 1

During baseline for Teacher 1, the rate of task related instructions averaged 2.46 (range: 1.8 to 2.8) per min while the rate of instructions meeting experimenter criteria averaged only 0.28. Instructions meeting criteria decreased from 0.64 per min to 0 per min during baseline. The training package was applied in session 4 and resulted in 1.6 task related instructions per min and all met training criteria. Following the training session, maintenance data were collected for five sessions and then a general instruction to generalize was given. Those data showed task related instructions given at an average rate of 1.58 per min (range: 0.6 to 3) and the rate meeting criteria was 1.52 (range: 0.6 to

3). There was a decreasing trend in the rate of task related instructions given, (3, 2.6, 2.4, 2.2, 1.2, 1.8, 1, 1.2, 0.6) but the rate of those instructions meeting criteria continued to match closely those that were given.

The adjacent graph to the right depicts task related instructions in relation to teacher praise and child correct responding. In baseline, the child responded correctly an average rate of 1.37 per min (range: 1 to 1.92) to an average rate of 2.46 instructions given per min. Descriptive praise to the correct responses was delivered an average rate of 0.62 (range: 0.2 to 0.86) per min. During training and maintenance, the child responded correctly an average rate of 0.96 (range: 0.6 to 2) and descriptive praise was provided at the same rate for each correct response. The rate of instructions given for the maintenance sessions was at an average of 1.58. During the general instruction for the teacher to generalize, child correct responses increased slightly to an average of 1.23 (range: 0.4 to 2) per min and descriptive praise to an average 1.18 (range: 0.4 to 1.8) per min.

In the NLP skill area, Teacher 1 began baseline with an average rate of 0.30 (4 data points ranging from 0 to 0.8) and then dropped to 0 for both arranging opportunities and accepting corresponding word approximations throughout the remainder of baseline. Following the initial training session, the rate of both arranging opportunities and accepting corresponding approximations rose to 1.2 per min. In the session following training, however, rates decreased to a rate of 0.4 opportunities arranged and 0.2 accepted. After the enhanced training package was implemented, opportunities arranged rose to a rate of 1.6 and approximations were accepted at a rate of 1.2 per min. During maintenance sessions, the behaviors continued to increase resulting in an average rate of

1.93 (range: 1.6 to 2.4) for opportunities arranged and 1.67 (range: 1.4 to 2) word approximations accepted.

The adjacent graph to the right depicts the rate of all word approximations emitted by the child and the rate the teacher contingently withheld tangible items and activities from the child to encourage the child to emit those word approximations. The rate of all word approximations during baseline was fairly high, averaging 6.38 (range: 3.6 to 8.4) while the rate of tangibles withheld averaged only 0.11 (range: 0 to 0.8) per min. After the first training session, word approximations rose to a rate of 9.2 per min with the rate of tangibles withheld rising to 1.2 times per mins. Throughout the remaining training and maintenance sessions, however, word approximations decreased to an average rate of 4.56 (range: 3.6 to 6.4) per min while the rate of withholding tangibles increased to 1.56 (range: 0.2 to 2.4).

Teacher 2

During baseline for Teacher 2, the average rate of task related instructions given was 2.6 (range: 2 to 3) per min while the rate of those instructions meeting criteria averaged 1.33 (range: 0.4 to 2.4). Following training, the rate of instructions given was 2.6 and the rate meeting criteria was 2.4. The proportion of instructions that met criteria remained high throughout maintenance sessions with the average rate of instructions given as 1.6 (range: 0.6 to 2.6) and the average rate meeting criteria at 1.51 (range: 0.6 to 2.4).

The adjacent graph to the right depicts both teacher instructions and child responses to instructions. During baseline, the rate of instructions given by the teacher averaged 2.6 and the rate of correct responses by the child averaged 1.47 (range: 0.6 to

2.4). The rate of descriptive praise provided by the teacher averaged 1.53 (range: 1 to 2.2) during baseline. Throughout the training and maintenance sessions the rate of instructions decreased, averaging 1.68 (range: 0.6 to 2.6). The rate of correct responses decreased slightly to 1.16 (range: 0.4 to 2.2) and descriptive praise provided by the teacher (an average rate of 1.1 [range: 0.2 to 2] per min) remained close to the child's rate of correct responding. The proportion of teacher target behaviors that met criteria remains high although the rate of the behavior does decrease as other behaviors are targeted.

In the NLP graph, the teacher averaged a rate of 0.11 (range: 0 to 0.6) opportunities arranged per min and an average rate of 0.06 (range: 0 to 0.4) corresponding word approximations accepted throughout the seven sessions of baseline. Implementation of the first training package resulted in an increase to 1.2 opportunities arranged per min and 1 corresponding word approximation accepted per min which maintained at 1.2 per min for both skills in the following session. When the enhanced training package was implemented, there was an increase in opportunities arranged to 2 per min and 1.8 word approximations accepted per min. Maintenance sessions following the enhanced training showed continued increases with an average rate of 2.48 (range: 2 to 3.2) opportunities arranged and corresponding word approximations accepted per min.

The adjacent graph to the right depicts the rate of all word approximations emitted by the child and the rate the teacher contingently withheld tangible items or activities from the child. Word approximations in baseline averaged at a rate of 5.06 (range: 4 to 6.2) and tangibles withheld averaged a rate of 0.11 (range: 0 to 0.6) per min. Throughout training and maintenance phases, however, the rate of withholding tangibles increased to

an average rate of 2.1 (range: 1 to 3.2) per min and the rate of word approximations by the child also increased to an average rate of 7.75 (range: 5.8 to 9).

Training and Generalization Tasks – Teacher 1

Figure 2 displays teacher behavior in both the training and generalization conditions. The two top graphs were also represented in Figure 1 but are presented here to facilitate a visual comparison of the training and generalization tasks. Again the data are represented in rate per min. For all graphs on the left side of the figure, open circles represent task related instructions given to the child and closed circles represent task related instructions meeting criteria. For the graphs on the right side of the figure, the open diamonds represent opportunities that the teacher arranged for the child to request an item or activity and the closed triangles represent the corresponding word approximations that the teacher accepted and reinforced with that item or activity.

The graphs on the left side are the teacher's instructions during all three tasks. The top graph on the left side shows Task 1 (expressive labels). This graph was described in the previous section (Figure 1). The second graph on the left side illustrates teacher behavior during Task 2 (receptive environmental identification). Similar to baseline in Task 1, the teacher gave task related instructions an average rate of 1.94 (range: 1.57 to 2.4) per min and 0 met criteria. After one training session in Task 1, a small increase was seen (1.4 instructions given per min and 0.6 per min given at criteria). For the next 5 maintenance sessions, the teacher gave instructions an average rate of 2.36 (range: 2 to 2.6) per min and met criteria an average rate of 1.92 (range: 1.4 to 2.4) per min. During the general instruction to generalize condition the teacher met criteria on a larger number of the instructions given. Remaining sessions averaged a rate of 1.28 (range: 0.6 to 2.2)

task related instructions given and a rate of 1.18 (range: 0.4 to 2) instructions meeting criteria.

The last graph on the left side represents the teacher's behavior during Task 3 (one-step direction following). The first three sessions resembled that of Task 2 and baseline in Task 1. The teacher gave an average rate of 2.13 (range: 1.07 to 3.6) task related instructions per min and gave 0 at criteria. After the training session in Task 1, the teacher increased those given at criteria to 0.6 per min while the rate of instructions given decreased to 1.8 per min. During maintenance sessions, the teacher averaged 1.75 (range: 1.2 to 2) task related instructions per min and 0.3 (range: 0 to 0.6) instructions meeting criteria. The general instruction to generalize was given and the teacher increased the instructions meeting criteria to an average of 0.7 (range: 0.2 to 1.2) per min and decreased task related instructions to an average of 1.43 (range: 1 to 2.2) per min. A specific instruction to generalize was given and the remaining two sessions resulted in an average rate of 1.3 (range: 1.2 to 1.4) task related instructions given and 1.1 (range: 1 to 1.2) instructions meeting criteria per min.

The graphs on the right half of the page represent NLP teacher behavior during Task 1. The first graph on the right side was described in the previous section (Figure 1).

The second graph on the right side depicts the teacher's behavior for Task 2. The first 11 sessions are similar to those of baseline in Task 1 with an average rate of 0.04 (range: 0 to 0.4) opportunities arranged and corresponding word approximations reinforced per min. After training in Task 1, the teacher arranged opportunities at a rate of 1.2 and accepted approximations at a rate of 0.8 per min. The maintenance session resulted in a decreased rate for both opportunities arranged and approximations accepted

per min (0.6). After the enhanced training in Task 1, the rate of opportunities arranged increased to 2 per min and 1 approximation accepted per min. Maintenance sessions resulted in an average rate of 2.07 (range: 1.8 to 2.4) opportunities arranged and 1.8 (range: 1.6 to 2) corresponding word approximations accepted per min.

The last graph on the right side represents the teacher's behavior during Task 3. The first 11 sessions are similar to Task 2 and baseline in Task 1. Ten of the first 11 sessions resulted in 0 occurrences of either teacher behavior. The rate of both opportunities arranged and corresponding word approximations averaged 0.02 (range: 0 to 0.2) per min. Following training in Task 1, opportunities were arranged and word approximations were reinforced at a rate of 1 per min. Maintenance session resulted in a rate of 1.4 opportunities arranged and word approximations accepted per min. The enhanced training in Task 1 resulted in no increase with the rate of opportunities arranged averaging 1.3 (range: 1.2 to 1.4) per min and approximations accepted averaging 1.1 (range: 1 to 1.2) per min. During the specific instruction to generalize in this task, the sessions averaged a rate of 1.2 (range: 1 to 1.4) opportunities arranged and 1 (range: 0.8 to 1.2) corresponding word approximations reinforced per min.

Training and Generalization Graphs – Teacher 2

The format of Figure 3 is identical to Figure 2 (Teacher 1) and contains the results of training for Teacher 2.

The graphs on the left side represent the teacher's instructions during all three tasks. The top graph on the left side shows Task 1 (expressive labels). This graph was described in the previous section (Figure1). The second graph on the left side illustrates teacher behavior during Task 2 (receptive environmental identification). During baseline,

the teacher gave task related instructions an average rate of 2.13 (range: 1.4 to 2.6) per min and accepted approximations an average rate of 0.47 (range: 0.2 to 0.8) per min. Following training in Task 1, instructions were given at a rate 1.8 per min and met criteria at a rate of 0.6 per min. Task related instructions averaged 1.56 (range: 0.8 to 2.4) per min and instructions meeting criteria averaged 0.98 (range: 0.2 to 1.6) per min during maintenance sessions. Following the specific instruction to generalize, task related instructions were given and met criteria an average rate of 1.1 (range: 1 to 1.2) per min.

The last graph on the left side depicts teacher behavior during Task 3 (one-step direction following). The first three sessions resembled Task 2. The teacher gave an average rate of 2.27 (range: 2 to 2.4) instructions per min and gave an average rate of 0.47 (range: 0.2 to 0.8) at criteria. After the training in Task 1, the teacher increased those given at criteria to 1.8 per min out of 2.8 task related instructions given per min. During maintenance sessions, instructions were given an average rate of 1.6 (range: 0.6 to 2.8) per min and met criteria an average rate of 0.76 (range: 0.4 to 1.4) per min. Following the specific instruction to generalize, the teacher averaged 1.1 (range: 0.8 to 1.4) instructions given per min and 0.4 (range: 0.2 to 0.6) instructions meeting criteria per min.

The graphs on the right half of the page represent NLP teacher behavior during Task 1. The first graph on the right side was described in the previous section (Figure 1). The second graph on the right side depicts the teacher's behavior for Task 2. Unlike baseline for Task 1, during this task the teacher begins by arranging 1 opportunity per min and accepting 1 approximation per min. This decreases throughout baseline resulting in an average of 0.69 (range: 0.2 to 1.2) opportunities arranged and approximations accepted per min. Following training in Task 1, opportunities are arranged and

approximations accepted at a rate of 0.4 per min. During maintenance, the rate stays low at 0.2 per min for both opportunities and approximations. Following the enhanced training in Task 1, 1.8 opportunities are arranged per min and 1.6 approximations are accepted per min. Further maintenance sessions revealed an average of 2.2 (range 1.6 to 2.8) opportunities arranged per min and 1.73 (range: 1.4 to 2) approximations accepted per min. During the specific instruction to generalize, the teacher arranged an average 2 (range: 1.8 to 2.2) opportunities per min and accepted an average 1.7 (range: 1.4 to 2) corresponding word approximations.

The last graph on the right side represents the teacher's behavior during Task 3. The teacher arranged an average of 0.37 (range: 0 to 1) opportunities and accepted an average of 0.31 (range: 0 to 1) word approximations. Following training in Task 1, opportunities were arranged and approximations were accepted a rate of 1.4 per min. During maintenance, 0.4 arranged opportunities and accepted approximations occurred every min. After the enhanced training was implemented in Task 1, opportunities were arranged a rate of 2.8 per min and corresponding word approximations were accepted a rate of 1 per min. During maintenance sessions, arranged opportunities averaged 1.93 (range: 1.6 to 2.6) per min and accepted word approximations averaged 1.8 (range: 1.2 to 2.6) per min. During the specific instruction to generalize, the teacher arranged opportunities and accepted approximations an average rate of 1.7 (range: 1.2 to 2.2) per min.

CHAPTER 4

DISCUSSION

The results of this experiment show that the application of a simple and efficiently implemented training package produced increases in effective teaching skills in teachers of children with autism. The child's word approximations increased in frequency and corresponded with the changes in the teachers' behaviors. The child's task related correct responses reliably followed the teachers' instructions that met criteria. Although some generalization of trained teaching skills was seen, the data show that the teaching skills trained in this study did not immediately generalize to all other teaching settings and tasks. General verbal instructions (mediators) to the teacher to use those skills in other areas were not effective in achieving generalization. Skills generalized in at least one task area for both teachers following specific instructions that named the task where that specific skill should be applied. The results of this study, therefore, sustain and expand on the literature in which an efficient training package, (modeling, role-playing and feedback), can be effective in training specific teaching skills (Baer, Peterson, & Sherman, 1967; Cooper, Thomson, & Baer, 1970; Cossairt, Hall, & Hopkins, 1973; Garcia, Baer, & Firestone, 1971; Gardner, 1972; Harris et al., 1998; Isaacs, Embry, & Baer, 1982; Jones & Eimers, 1975; Panyan, Boozer, & Morris, 1970; Ringer, 1973) and can produce generalization when accompanied by a specific instruction to do so, (Feldman et al., 1989; Stokes & Baer, 1977)

Some interesting findings in this study occurred as early as the initial baseline conditions. The two teachers differed greatly in their performances during baseline. While Teacher 1 initially gave no instructions at criteria, Teacher 2 gave some at criteria in all tasks and several at criteria before any training occurred in the expressive labels task. Her responding decreased before the onset of training, possibly due to a lack of feedback regarding that performance. Similarly, during the NLP component training (arranging opportunities and accepting approximations), Teacher 1 displayed none of the target responses during baseline while Teacher 2 emitted the NLP responses a few times during some of the baseline sessions. For both teachers, training in the NLP components resulted in some increases. Those behaviors, however, decreased for Teacher 1 in the first maintenance session. Following the implementation of enhanced training procedure, not only were higher increases shown, but also increases that appeared to maintain over time.

The DTT components (Anderson & Romanczyk, 1999; Anderson, Taras, & O'Malley Cannon, 1996; Lovaas, 1987) and the NLP components (Koegel, O'Dell, & Dunlap, 1988; Koegel, O'Dell, & Koegel, 1987) appeared to have involved incompatible behaviors. The two skill areas seemed to interact with one another. That is, the rate of DTT behavior (instructions) decreased during maintenance conditions, while the rate was higher for the NLP behaviors currently in training and maintenance conditions. What is important, however, is that the rate of responses at criteria remains near to the rate of the total responding, as is graphically represented by the two joined data paths. Another point to consider is that at this point in the child's treatment program, the NLP components were more important than giving the child many instructions during a session. Increases in rates of verbalization were a treatment priority for this child. The NLP procedures

produced increases in rates of the child's responding. The decrease in teacher instructions with a subsequent increase in NLP skills is a desirable effect, as long as teachers' skill responding is at criteria.

One interesting finding with respect to generalization of teaching skills is that generalization of giving appropriate instructions did not occur in Task 3 with either teacher. Generalization was seen in Task 2, but the instructions did not meet criteria all of the time in any given session. The trainer for Teacher 1 gave a general instruction to generalize telling the teacher to apply what she's learned thus far to all task areas. This instruction appeared to be successful for Task 2 (receptive environmental identification) but not for Task 3 (direction following). A specific instruction to generalize was then used for Task 3 at which point generalization did appear to occur.

Teacher 2 did not receive the general instruction to generalize. Instead, the specific instruction to generalize was implemented on the skills in the task areas needed. This included both skill areas in Task 2 and 3. As a result, generalization occurred with instructions in Task 2 but not in Task 3. With the NLP components, generalization seemed to occur after the specific instruction in both Task 2 and 3. The rates in both tasks were lower than expected, but similar to rates in the previous maintenance session (not resulting in a decrease).

Some possible explanations of the varying degrees of observed generalization could include the difficulty of the skills in the context of that task, sequence order effects (as Task 1, 2, and 3 were always performed in that order), effects of child compliance on teacher performance in the context of that task, different settings (same as the training task, but different than Task 2), or whether the child was responding correctly or

requiring prompting in those particular tasks. All tasks included in the study were current tasks addressed in the child's ongoing in-home treatment program. Task 1, expressive labels, required the child to respond based on visual cues, (i.e., pictures of objects). The child always responded to the pictures, although sometimes incorrectly. Also, the child was usually seated in one area in the playroom, either on the floor or in a chair while the context related instructions were given. During Task 2, receptive environmental identification, the conditions were much different. The setting had changed to the kitchen, the child was required to respond to auditory stimuli, (i.e., verbal instructions), and the child walked to and physically touched the item named in the verbal instructions. This appeared to be an enjoyable task for the child and involved gross motor movement and a high rate of reinforcement due to the child responding quickly and correctly at a high rate. Task 3, direction following, involved the child responding to auditory stimuli as was the case in Task 2. The child was seated in the playroom, making it slightly different from the previous tasks, but containing common stimulus components from both tasks. Another factor might be that the direction following program was considered a more difficult task and for this reason was introduced to the in-home program at a later date than the other tasks (1 month prior to the initiation of this study). During the sessions for this task, the child either did not respond to the task stimuli or required prompts instead of responding with a label (correct or incorrect) as was seen frequently in the first two tasks. The teachers attempted to incorporate the directions into the child's play by giving the direction while the child was playing rather than ceasing the child's play and obtaining the child's attention before delivering the instruction as they had done in the previous tasks. Task order is another consideration, and it is important to note that Task 3

was always performed last. It is impossible to determine if this was a factor as no actions were taken to manipulate this variable. It is possible that the teacher was less attentive to her own behavior by the time the second task had been completed and less effort was given to using the teaching skills at criteria by this time in the session. An additional possibility is that the child was exercising less effort to respond correctly by this point in the session, perhaps due to the slower pace of instruction and lower density of reinforcement that can occur in the presence of a novice teacher (Carr, et al., 1998). The teachers' not meeting criteria may have been a function of the child's lack of responding due to the difficulty and inherent lower density of reinforcement for that particular task.

With regard to the child's responding in relation to the teacher's responding, the verbal word approximations appeared to change as a function of the teachers' behavior. The child, however, responded differently to each teacher. During NLP baselines for Teacher 1, the child's overall word approximations were fairly high. When the teacher began withholding access to tangible items and activities, the child's overall word approximations decreased slightly. Teacher 2, however, was trained to use the same technique and, conversely, the child increased his word approximations once she began withholding access to items and activities. This difference may be due to the topography of withholding access (i.e., whether they held the item within reach, or within the child's sight, etc.) or, more likely, that Teacher 1 was often withholding access without accepting the child's approximations, thereby not meeting the NLP criteria (Koegel, O'Dell, & Dunlap, 1988).

Although certain DTT and NLP components were targeted, it is important to note that providing contingent praise and social reinforcement (Kazdin & Moyer, 1976), other

DTT components, were not targeted because the teachers appeared to acquire the skill without specific training. During the modeling portion of training, the trainer would give instructions to the child and complete the trials by providing descriptive praise to the child and delivery of either tangible or social praise. Descriptive praise by the teacher to the child was recorded throughout the study. For Teacher 1, descriptive praise was offered infrequently although the child had made several correct responses. After the first training phase for giving instructions, the teacher began to give descriptive praise for most of the child's correct responses. Teacher 2 gave descriptive praise for most of the child's correct responses during baseline and continued to do so throughout the study. Both teachers were eventually provided feedback on their spontaneous use of descriptive praise and were encouraged to continue using it contingently.

During baseline for both teachers, the child was responding correctly to about half of the teachers' instructions (most of those instructions were not given at criteria). The rate of the child's correct responding did not appear to increase over the course of the study. When looking, however, at the proportion of correct responses to instructions given, more instructions were answered correctly after training. This decrease in rate of instructions given is an important clinical aspect as the goal of the therapy is not to flood the child with instructions, but rather to balance the number (or rate) of appropriate task related instructions with the number of opportunities arranged for language.

It is important to note that this study utilized a training package, and it is not evident if one or more components of the package applied in a different composition would have produced changes in teacher and child behavior. The literature suggests while modeling (Baer, Peterson, & Sherman, 1967; Garcia, Baer, & Firestone, 1971; Ringer,

1973), role-playing (Gardner, 1972), and feedback (Cooper, Thomson, & Baer, 1970; Fabry & Reid, 1978; Harris et al., 1998; Panyan, Boozer, & Morris, 1970) alone can be effective, the implementation of a "package" (Cossairt, Hall, & Hopkins, 1973; Isaacs, Embry & Baer, 1982; Jones & Eimers, 1975; Kazdin & Moyer, 1976; Koegel, Russo, & Rincover, 1977) is important for effective behavior change to occur efficiently.

Furthermore, the change in the child behavior is important in evaluating the effects of a treatment package (Baer, Wolf, & Risley, 1968). First, and obviously, if the changes in the teachers' behavior do not produce corresponding and desirable changes in child behavior, the teacher training is futile. The second issue is illustrated nicely in the case of vocalizations as appropriate implementation of NLP components. That is, a relationship between full criteria responding on the teachers' part and child vocalizations was demonstrated to some degree. These two points strengthen Baer, Wolf and Risley's (1968) argument that investigators should include measures of all organisms relevant to the purpose of the study.

As pointed out in previous literature, effective training packages should both teach a person to use procedures to modify behaviors that he or she could not modify before and should also establish a set of general skills to allow for modifying different behaviors in different subjects (Gladstone & Sherman, 1975). The results of this study did accomplish those two goals. As generalization is so rarely seen across task areas and teaching skills, (Koegel, Glahn, & Nieminen, 1978; Page, Iwata, & Reid, 1982), generalization has been noted repeatedly across subjects, time, or similar task instructions (Ducharme & Feldman, 1995; Feldman et al., 1989; Gladstone & Sherman, 1975; Gladstone & Spencer, 1977; Horton, 1975; Koegel, Glahn, & Nieminen, 1978; Koegel,

Russo, & Rincover, 1977; Lovaas, et al., 1973; Peck, Killen, & Baumgart, 1989). The question that should be asked is not only did generalization occur, but also what procedures are most likely to produce generalization (Bernstein, 1982)? In the present investigation, generalization occurred without specific training. However, when it did not occur, utilizing the instruction to generalize (Feldman et al., 1989; Stokes & Baer, 1977) did seem to produce generalization of the some of the teaching behaviors targeted. The need to instruct the teacher to generalize in a specific manner for each skill that has not generalized might lead to a less efficient training package. The efficiency of this training procedure, a one session intervention for each targeted skill, may be more alluring to trainers than previous designs such as one that required 25 hours of training in addition to an extensive manual and videotape samples (Koegel, Russo, & Rincover, 1977). It is important to remember, however, that both of these participants were enrolled in several classes in behavior analysis and there is no way to rule out the effects of this on their responding to the intervention. That is, would have more training sessions been necessary if they had not had extensive didactic instruction? An efficient training method would provide teachers with the skills that enable them to modify difficult behaviors and increase desired behaviors in all subjects, settings, tasks, or other conditions that are different from those in which they were trained. On the other hand, the degree of generalization that occurred without training is encouraging. Trainers could use such a training package for new teachers and use follow-up measures to check for generalization. In the areas that the teacher does not appear to be utilizing the skills previously trained, the trainer can give a specific instruction for them to begin using those skills in that particular area, or with a certain child, or specific setting, etc. This may be

quite an effective and efficient method of obtaining generalization under conditions of limited resources, such as time constraints, schedule conflicts, lack of funding, stress level of family or service providers, etc. (Robbins, Dunlap, & Plienis, 1991).

This study has demonstrated the effectiveness of a training package used with two teachers and two different teacher trainers all with varying strengths and experience. For example, the trainer for Teacher 2 had 3 years more experience in supervision and training than the trainer for Teacher 1. The study has extended the literature by applying a training package on a teacher of a child with autism and replicating the findings with a second teacher. The training package was applied to component skills of both discrete trial and natural environment (specifically NLP) teaching in the context of three constant task areas, requiring the teacher to use natural environment teaching in the discrete trial setting and vice versa. Generalization did occur across task areas both with and without the use of general and specific instructions to generalize despite the differences and difficulty of tasks, and the varying strengths among the teachers and teacher trainers. And finally, child responding did improve as a function of the teachers meeting criteria on the trained skills.

APPENDIX A

CONSENT FORM FOR TEACHER

Teacher Informed Consent Form

Dear Teacher,

I will be conducting a research project designed to train therapists in specific teaching skills necessary to produce desired behavior change in children with autism. There are no expected risks to the subjects inherent in this study. I request permission for your participation.

This study will take place in the child's home. It will be conducted by myself, the principal investigator, and will employ the use of you as a new therapist with no prior training. You will be working with the child directly under my supervision. Training sessions will occur two to four times a week for six to twelve weeks. The training sessions will involve videotaping, modeling, roleplaying, and feedback. Taping will be carried out by a North Texas Autism Project (NTAP) research assistant. These vignettes will be used for purposes related to this study including data scoring, reliability, or consultation with our clinic directors. The tapes will be retained by me upon conclusion of the study and will be destroyed following data analysis and manuscript preparation. The taped segments will be used for educational purposes only. To preserve confidentiality, only first names will be used to identify you and the child during discussion with professors and NTAP staff. For manuscript purposes, your name will not be used and a code will be used on any printed material.

Your behaviors, as well as the child's, will be observed and recorded for data analysis and determining procedural directions.

Should you have any questions or need further information, please call the Principal Investigator, Rebecca Sawyer at 940/498-1353 or Dr. Shahla Ala'i-Rosales at 940/369-7454 in the Department of Behavior Analysis.

I, _____, agree to participate in this project. I have read the above and have heard a clear explanation of the purpose of this study. I understand the procedures of the study and the commitment required on my part. I understand that my participation is voluntary and I may withdraw myself and my consent and discontinue participation at any time without prejudice or penalty. I understand I will be provided with a copy of this consent form.

_____ _____

Date Teacher Participant

_____ _____

Date Principal Investigator

This project has been reviewed and approved by the UNT Human Subject's Review Board (940-565-3940).

APPENDIX B

CONSENT FORM FOR PARENT OF CHILD

Parental Informed Consent Form

Dear Parent,

I will be conducting a research project designed to train therapists in specific teaching skills necessary to produce desired behavior change in children with autism. There are no expected risks to the subjects inherent in this study. I request permission for your child to participate.

This study will take place for the most part in your home. As Principal Investigator, I will conduct the study and employ the use of a new therapist with no prior training who will be working with your child directly under my supervision. Training sessions will occur two to four times a week for six to twelve weeks. The training sessions will involve videotaping, modeling (the principal investigator will model correct teaching procedures to be used with your child), role playing (the principal investigator will role play teaching scenarios with the therapist) and feedback (the principal investigator will provide feedback to the therapist as they are working with your child). Many of these training sessions involving the therapist and child in your home will be videotaped. A North Texas Autism Project (NTAP) research assistant will carry out taping. These vignettes will be used for purposes related to this study including data scoring, reliability, or consultation with our clinic directors. I will retain the tapes upon conclusion of the study. Tapes will be destroyed following data analysis and manuscript preparation. The taped segments will be used for educational purposes only. To preserve confidentiality, only first names will be used to identify your child during discussion with professors and NTAP staff. For manuscript purposes, your child's name will not be used instead a code will be placed on any printed material.

The behaviors of your child as well as the therapist's will be observed and recorded for data analysis and determining procedural directions.

Should you have any questions or desire further information, please contact the Principal Investigator, Rebecca Sawyer at 940/498-1353 or Dr. Shahla Ala'i-Rosales at 940/369-7454 in the Department of Behavior Analysis.

I, _____, grant permission for my child _____ to participate in this project. I have read the above and have heard a clear explanation of the purpose of this study and the commitment required on my part. I understand that my participation is voluntary and I may withdraw my consent and discontinue participation at any time without prejudice or penalty. I understand I will be provided a copy of this consent form.

_____	_____
Date	Signature of Parent of Child Participant
_____	_____
Date	Principal Investigator

This project has been reviewed and approved by the UNT Human Subject's Review Board (940-565-3940).

APPENDIX C

OBSERVATION PROTOCOL

(DATASHEETS, OPERATIONAL DEFINITIONS AND SCORING RULES)

Observer: ______________________________ Date: ____________________

Phase: ______________________________ Teacher: **T1 / T2** Child: **C1**

Task	**Interval**	Instructions (clarity & number)	Child's Response	Praise Statements
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
		C U I_______	+ - P	G D
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		C U I_______	+ - P	G D
		C U I_______	+ - P	G D

CODES

TEACHER
C = Clear instruction
U = Unclear instruction
I = Tally # of instructions (repeated)
G = General praise
D = Descriptive praise

CHILD
+ = Correct response
- = Incorrect response
P = Prompted response

Observer: _____ Date: _____

Phase: _____ Teacher: **T1 / T2** Child: **C1**

Observing: **Opportunities & Approximations OR Engagement**

Second	0-10	11-20	21-30	31-40	41-50	51-60
Task Activity _____						
Minute 0						
1						
2						
3						
4						
Totals:						
Task Activity _____						
Minute 0						
1						
2						
3						
4						
Totals:						
Task Activity _____						
Minute 0						
1						
2						
3						
4						
Totals:						

CODES:

TEACHER	CHILD	CHILD ENGAGEMENT
O = Opportunity arranged	I = Tally word approximations	E = if whole interval child was engaged
A = Approximation accepted		U = if child not engaged for any part of interval

OBSERVATIONAL CODES & DEFINITIONS

TEACHER BEHAVIORS

Giving an Instruction One Time and Clearly: The teacher delivers an instruction only one time in a clear neutral voice before allowing the child to respond or delivering a prompt. The child's face should be oriented towards the teacher's body for the onset of the instruction for it to be given "clearly".

One time

Count: Record the number of times the teacher delivers the same instruction.

Include: Mark a tally for every instruction given to the child before the child responds or is prompted to respond.

Exclude: The teacher gives the child an instruction and the child complies then a different instruction is given. The teacher gives an instruction and the child complies and the teacher gives the same instruction again (i.e., "Come here", child responds correctly, the teacher moves farther away and says again "Come here")

Clear

Count: When the teacher delivers an instruction, mark the instruction as clear "C" or unclear "U".

Clear include: Instructions that contain as few words as possible and relate directly to the desired child response.

Clear include: As the teacher gives the instruction, the child is looking toward her, and then looks away.

Clear exclude: Instructions that are lengthy, in the form of a yes/no question, or contain unnecessary words such as adjectives or the child's name.

Clear exclude: The teacher gives an instruction while the child is looking away.

Unclear

Unclear include: Instructions that are delivered lengthy, in the form of a yes/no question, or contain unnecessary words such as adjectives or the child's name.

Unclear exclude: Instructions that contain as few words as possible and relate directly to the desired child response.

Providing Descriptive Praise: Praise statements that immediately follow a child's response in which the teacher includes a description of the child's response.

Count: Mark a "D" when the teacher makes a praise statement that describes what the child did. Mark a "G" when the praise statement is general.

Include: Praise statements following a child's response that contain a description of the child's response or merely repeat the child's response (i.e., "Good coming here" when child comes to teacher, "Window!" when child successfully points to the window)

Exclude: Praise statements that are general in nature (i.e., "Good job").

Arranging Opportunity: The teacher arranges an opportunity for the child to make a request by withholding access to an item and waiting for the child to make a request.

Count: Mark "O" for each opportunity arranged

Include: Any time the teacher holds an item in the child's sight and looks expectantly at the child but does not allow access to the item.

Exclude: The teacher withholds access to an item contingent on a response not related to the item (i.e., withholding bubbles for correct responding to an instruction).

Accepting Vocal Approximations: The teacher reinforces the child's vocal response that is not currently spoken at criteria but a close approximation to the criterion response.

Count: Mark "A" for each vocal approximation that is reinforced**.**

Include: Reinforcing sounds that are components or sound like components of the target word or words that are components of the target phrase (i.e., "bah" for ball, **"**tah" for car, "doe tah" for go car, "doe" for go car)

Exclude: Reinforcing sounds or words that do not comprise the target response (i.e., "ch" for ball, "beep beep" for go car)

Expansions: The teacher expands on the child's vocalizations by either immediately repeating the correct pronunciation (if the child made a vocal approximation), or immediately repeating and adding 1 to 2 words to the child's spoken word or phrase.

Count: Mark "+" for every expansion provided by the teacher.

Include: Expanding a child's vocal approximation by just repeating the appropriate word pronunciation (i.e., child says "duh" and teacher says "duck").

Include: Repeating child's correctly pronounced word or phrase and adding 1 to 2 words to expand to a longer utterance (i.e., child says "bye bye" and teacher says "bye bye duck").

Exclude: Adding 3 or more words to an approximation or word spoken by the child (i.e., child says "duck" and teacher says "that's right, you said duck")

Exclude: Expansions that do not occur immediately after the child's vocal response.

CHILD BEHAVIORS

Child Correct or Incorrect Response: Child response that is appropriate (correct) or inappropriate (incorrect) to the teachers instruction.

Count: Mark correct "+" or incorrect "-" after the teacher's first instruction. If child is prompted either verbally or physically to perform the correct response, mark "P".

Correct

Include: Each time the child emits a response that is appropriate as indicated by the teacher's instruction within 5 s of the instruction.

Exclude: Any other independent response that is not appropriate according to the teacher's instruction or occurs 6 s after the instruction.

Incorrect

Include: Any other independent response (including what may appear to be no response) that is not appropriate according to the teacher's instruction or a response that occurs 6 s after the instruction

Exclude: Each time the child emits a response that is appropriate as indicated by the teacher's instruction and occurs within 5 s of the instruction.

Prompted

Include: A response made by the child immediately following the answer modeled by the teacher or a response that is paired with physical guidance.

Include: If teacher prompts after the child already responded incorrectly.

Exclude: A response made before such prompts were utilized.

Vocal Word Approximations: The child's vocal responses that sound similiar to words and are related to items and activities in the child's environment.

Count: Mark a tally for each word approximation.

Include: Sounds and combinations of sounds that are components or sound like components of a word (i.e., "bah" ball, **"**tah" car, "doe" go)

Exclude: Sounds and combinations of sounds that do not approximate a common known word or are unrelated to the items and activities in the child's environment (i.e., "ch" when playing ball, "oo oo bah bah" when running)

Engagement in Activities: Child is engaged when the face and body are oriented toward an activity or person and are engaging in some appropriate behavior with item(s) or a person.

Count: Mark "E" engaged when child is observed to be engaged in an activity. Mark "U" unengaged when not engaged in an activity or when behavior within that activity is not appropriate for the activity.

Include: Eye contact with an item or person or typical interactions occurring with the item or person.

Exclude: Obsessive/repetitive interactions with a particular item, or looking or walking away from an activity or person following an instruction related to that activity.

APPENDIX D

TABLES

Table 1.
Interobserver Agreement

Teacher 1		
Baseline Conditions		
Task 1 – Expressive Labeling		
	Teacher behavior	98%
	Child behavior	81%
Task 2 – Environmental Identification		
	Teacher behavior	92%
	Child behavior	93%
Task 3 – Direction Following		
	Teacher behavior	98%
	Child behavior	94%
Intervention Conditions		
Task 1 – Expressive Labeling		
	Teacher behavior	100%
	Child behavior	100%
Task 2 – Environmental Identification		
	Teacher behavior	90%
	Child behavior	71%
Task 3 – Direction Following		
	Teacher behavior	100%
	Child behavior	84%
	Average (Teacher 1 & Child)	92%
Teacher 2		
Baseline Conditions		
Task 1 – Expressive Labeling		
	Teacher behavior	89%
	Child behavior	84%
Task 2 – Environmental Identification		
	Teacher behavior	88%
	Child behavior	97%
Task 3 – Direction Following		
	Teacher behavior	98%
	Child behavior	90%
Intervention Conditions		
Task 1 – Expressive Labeling		
	Teacher behavior	98%
	Child behavior	94%
Task 2 – Environmental Identification		
	Teacher behavior	96%
	Child behavior	96%
Task 3 – Direction Following		
	Teacher behavior	94%
	Child behavior	83%
	Average (Teacher 2 & Child)	92%

Total Average = 92%

APPENDIX E

FIGURES

Figure 1. Responding during Task 1

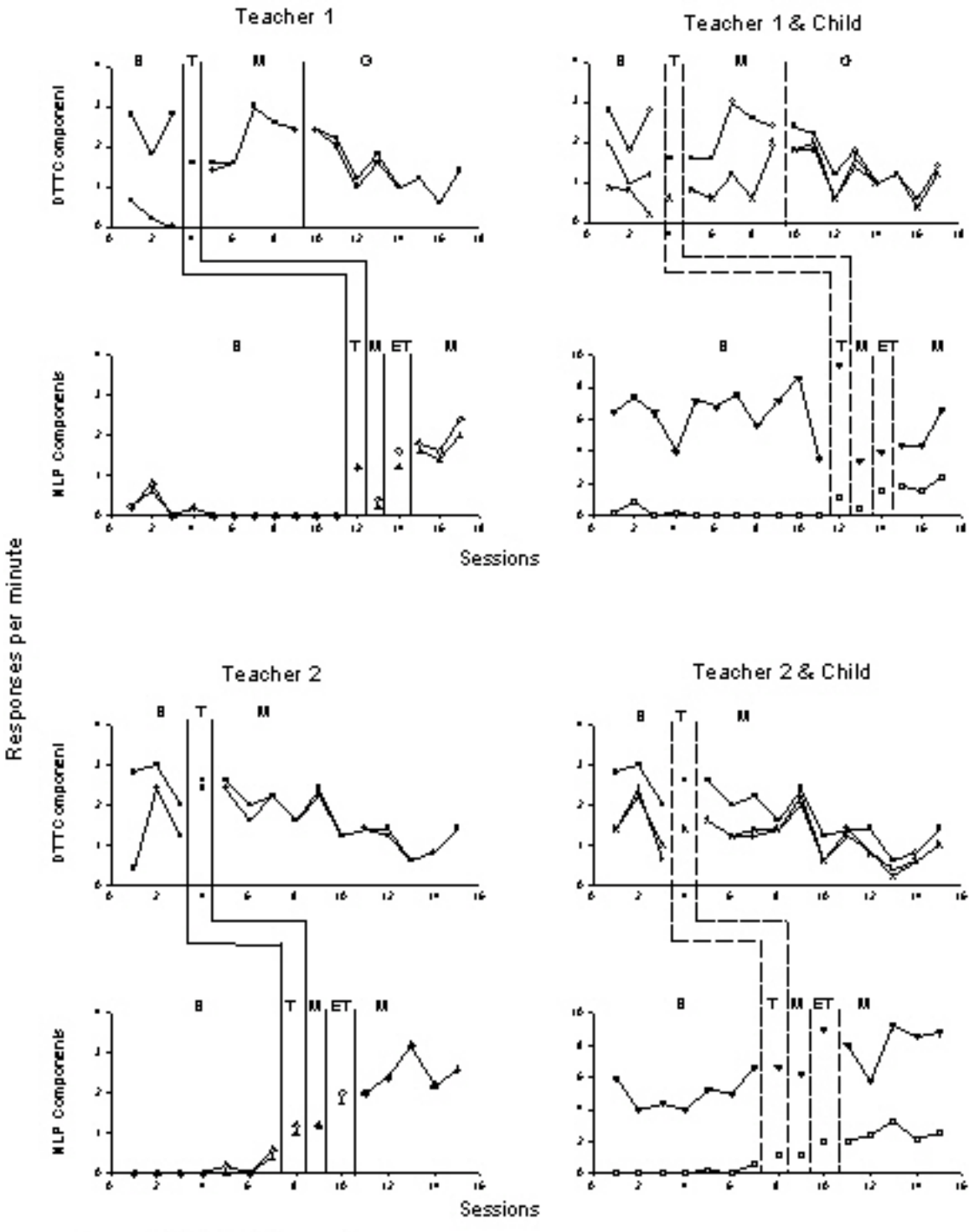


Figure 2. Teacher 1 responding during three tasks

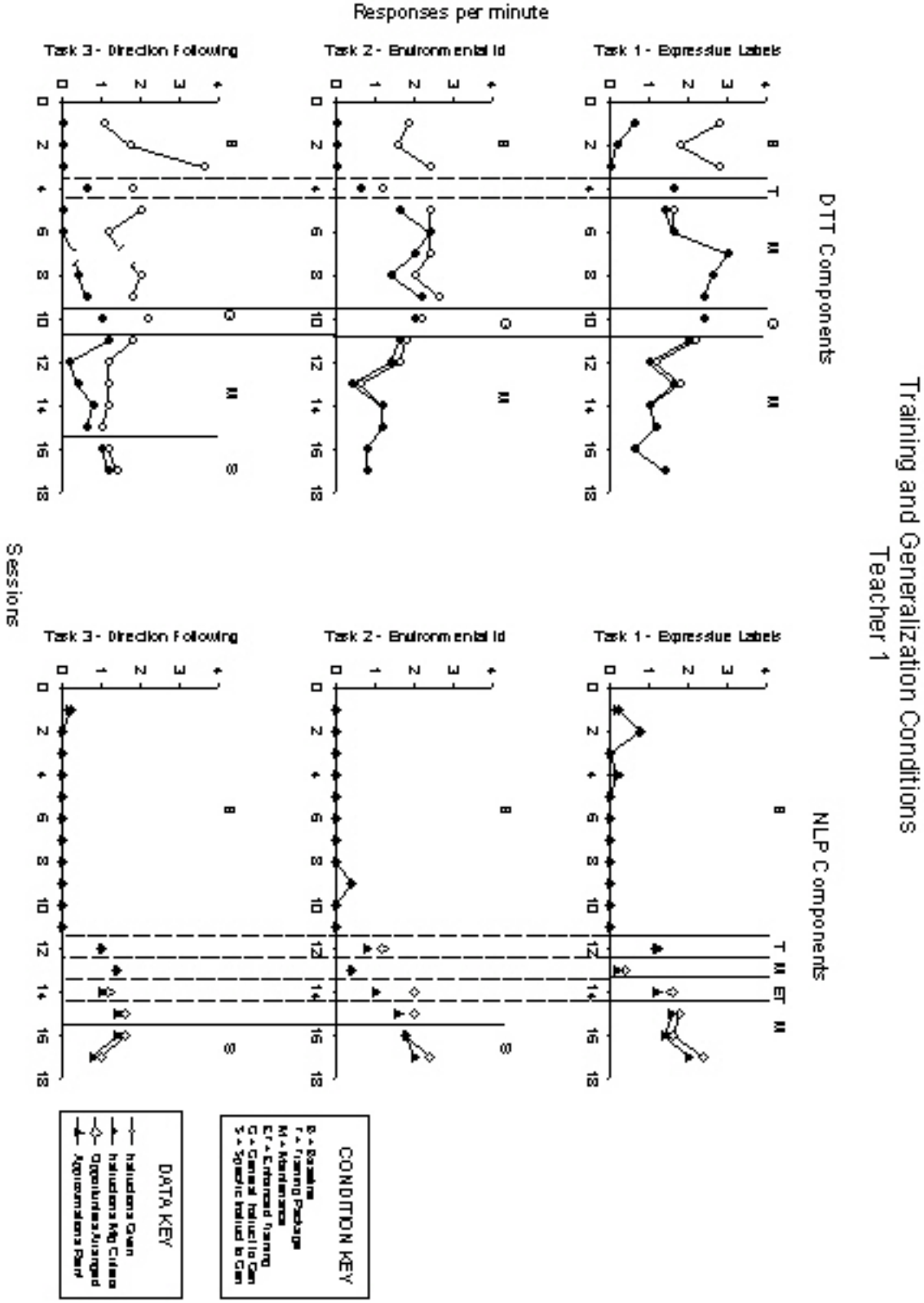
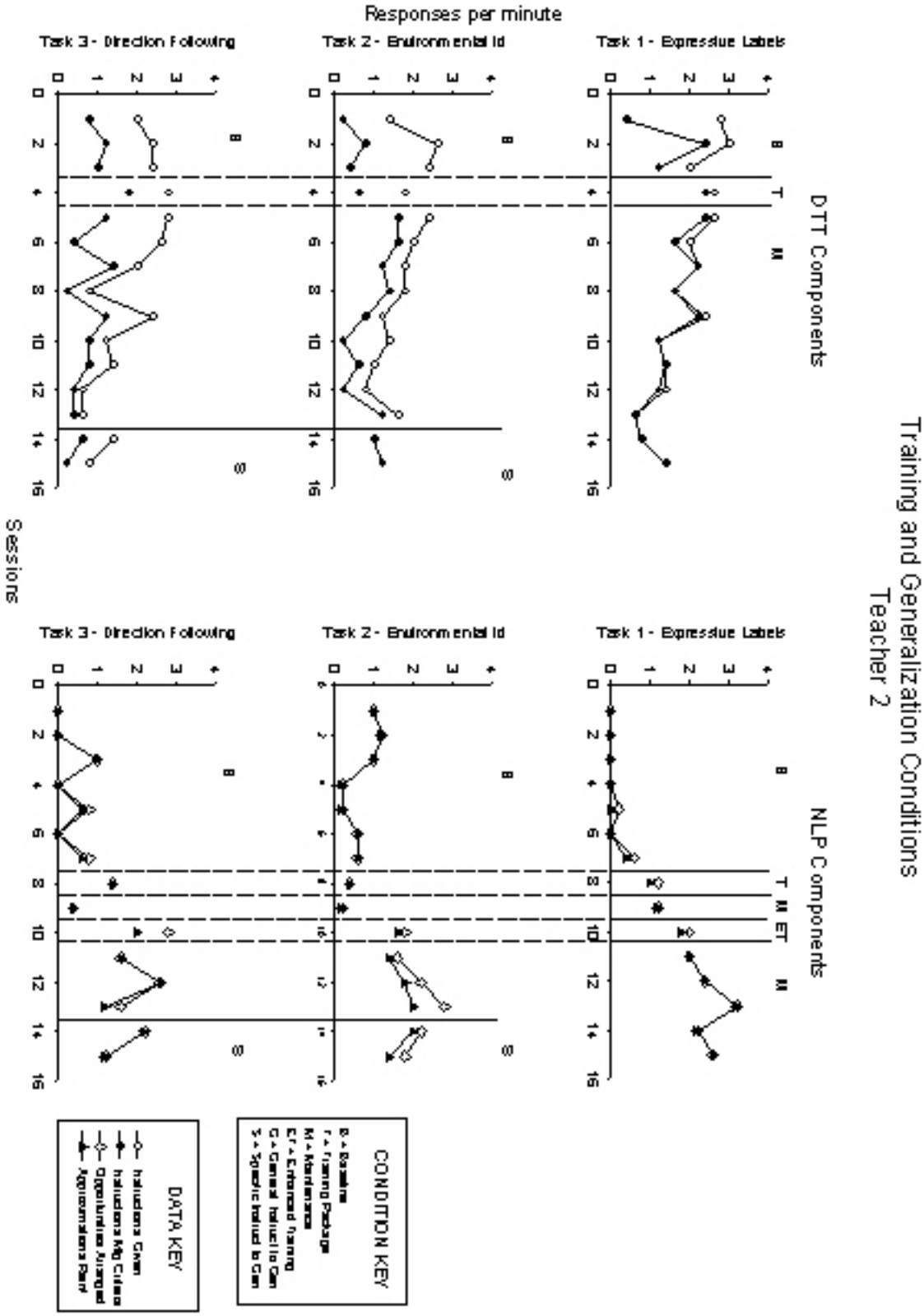


Figure 3. Teacher 2 responding during three tasks



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